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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,264	01/03/2002	Seungbae Park	EN999048D	8328

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EXAMINER

GARCIA, ERNESTO

ART UNIT PAPER NUMBER

3679

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/038,264

Applicant(s)

PARK ET AL.

Examiner

Ernesto Garcia

Art Unit

3679

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-16 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9, 10, 15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 10 is objected to because of the following informalities:

regarding claim 1, --portion-- needs to be inserted after "boundary" in line 6.

Appropriate correction is required.

Specification

The spacing of the lines of the specification is such as to make reading and entry of amendments difficult. New claims with lines double spaced are required.

The amendment filed 06/02/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material that is not supported by the original disclosure is as follows: the use of the term "intermetallic region" or "intermetallic regions" are new terms in the specification and the claims. The use of the two terms is different from that of "intermetallic boundary" or "intermetallic layer" as originally presented. The examiner did not catch the addition of "intermetallic region" in the amendment to the specification filed on 10/14/03, as that amendment introduced the term. Applicant is required to cancel the new matter in the reply to this

Office Action and use the original terms "intermetallic boundary" or "intermetallic layer" to avoid confusion.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 15 and 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claims 10 and 15, lines 7-10 of claim 10 and lines 8-10 of claim 15 recite "an intermetallic region penetrates both the solder and the upper surface of the pad". This subject matter cannot be found in the specification. The drawings don't suggest the solder or the upper surface being penetrated by something else. The terms intermetallic region or region, alone, does not appear in the original specification either.

Regarding claim 16, the limitations "a surface mounting attachment system utilizes a solder pad for attaching an electrical component to a solder pad on a substrate" in lines 1-3, and "a substantially planar lower surface disposed on the substrate" in line 5 do not appear in the specification. Nowhere do the terms "surface mounting attachment system", "electrical component", "solder bead", or "substrate" appear in the original specification. The drawings do not suggest a substrate being present or that the lower surface is disposed on the substrate.

Claims 10, 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 10 and 15, the limitation "an intermetallic region penetrating both the solder and the upper surface of the pad" in lines 7-10 of claim 10 or lines 8-10 of claim 15 makes unclear whether an intermetallic region is something physical or an abstract idea since there is nothing in the drawings that suggests something penetrating the solder or the upper surface. According to the original specification, lines 3-7 of page 1 state a solder boundary or interface is in the solder joint. This interface is between the pad and the solder.

Regarding claim 16, there is an inconsistency between the language in the preamble and certain portions in the body of the claims, thereby making the scope of

the claims unclear. The preamble clearly indicates the subcombination of a "surface mounting attachment system utilizing a solder bead" is being claimed with the functional recitation of the "system" being used "for attaching an electrical component to a solder pad on a substrate". However, the body of the claim positively recites "the substrate", e.g., "a substantially planar lower surface disposed on the substrate" (lines 4-5), which indicates the claims as being drawn to a combination of the "system" and the "substrate". Therefore, applicant must clarify what the claims are intended to be drawn to, i.e., either the "system" alone or in combination with the "substrate", and present the claims with the language which is consistent with the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9, 10 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Den Brekel et al., 4,605,153 (see marked-up attachment).

Regarding claim 9, Van Den Brekel et al., disclose, in Figure 2, a solder configuration comprising a pad **12** having a substantially planar lower surface **A2**, and a upper surface **A3**. The upper surface **A3** is characterized as substantially completely

non-planar-and-circuitous. Applicant is reminded that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Therefore, the upper surface can be adapted to receive solder thereby forming a solder boundary portion of a solder joint, whereby, a crack, forming in the solder proximate the solder boundary, is influenced to proceed in a direction substantially parallel to the upper surface thereby lengthening its travel, and increasing fatigue life of the solder joint.

Regarding claim 10, a solder configuration comprising a pad **12** having a substantially planar lower surface **A2**, and an upper surface **A3**. The upper surface **A3** is characterized as substantially completely non-planar serpentine surface. Applicant is reminded that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Therefore, the upper surface can be adapted to receive solder thereby forming a solder boundary portion of a solder joint, the solder boundary portion defining an intermetallic region extending therefrom and penetrating both the solder and the upper surface, whereby, a crack, forming in the solder proximate the solder boundary and within the intermetallic region, is influenced to proceed in a direction substantially parallel to the upper surface along a non-planar, serpentine path, thereby lengthening its travel, and increasing fatigue life of the solder joint.

Regarding claim 16, Van Den Brekel et al., disclose, in Figure 2, an improvement comprising a solder pad **12**, on a substrate **11**, having a substantially planar lower surface **A2** disposed on the substrate **11** and an upper surface **A3** characterized as substantially completely non-planar and circuitous. Applicant is reminded that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Therefore, the upper surface can be adapted to receive solder, such that when solder is applied thereto so as to form a solder joint any crack in the solder proximate the upper surface of the solder pad is influenced to proceed along a path substantially conforming to the non-planar and circuitous upper surface, thereby lengthening its travel, and preventing failure of the solder joint.

Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Baker et al., 4,532,681 (see marked-up attachment).

Regarding claim 15, Baker et al. disclose, in Figure 5, a solder configuration comprising a pad **41**, a solder **44** (see Abstract), and an intermetallic region **A5**. The pad **41** has a substantially planar lower surface **A2** and a upper surface **A3** characterized as substantially completely non-planar and circuitous. The solder **44** is applied to the upper surface **A3** thereby forming a solder joint therewith. The

intermetallic region **A5** is formed adjacent the upper surface **A3** and penetrates into both the pad **41** and the solder **44** adjacent the upper surface **A3**. The intermetallic region **A5** follows a path having a shape substantially identical to the upper surface **A3** such that a crack forming proximate the upper surface **A3** and within the intermetallic region **A5** is influenced to proceed in a direction substantially parallel to the upper surface **A3**, thereby lengthening its travel, and increase fatigue life of the solder joint.

Response to Arguments

Applicant's arguments with respect to claims 9 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernesto Garcia whose telephone number is 703-308-8606. The examiner can normally be reached from 9:30-6:00. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9326 for regular communications and 703-872-9327 for After Final communications.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on 703-308-2686. Any inquiry of a

general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



E.G.

July 23, 2004

Attachments: one marked-up copy of Van Den Brekel et al., 4,605,153; and,
one marked-up copy of Baker et al., 4,532,681.



DANIEL P. STODOLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

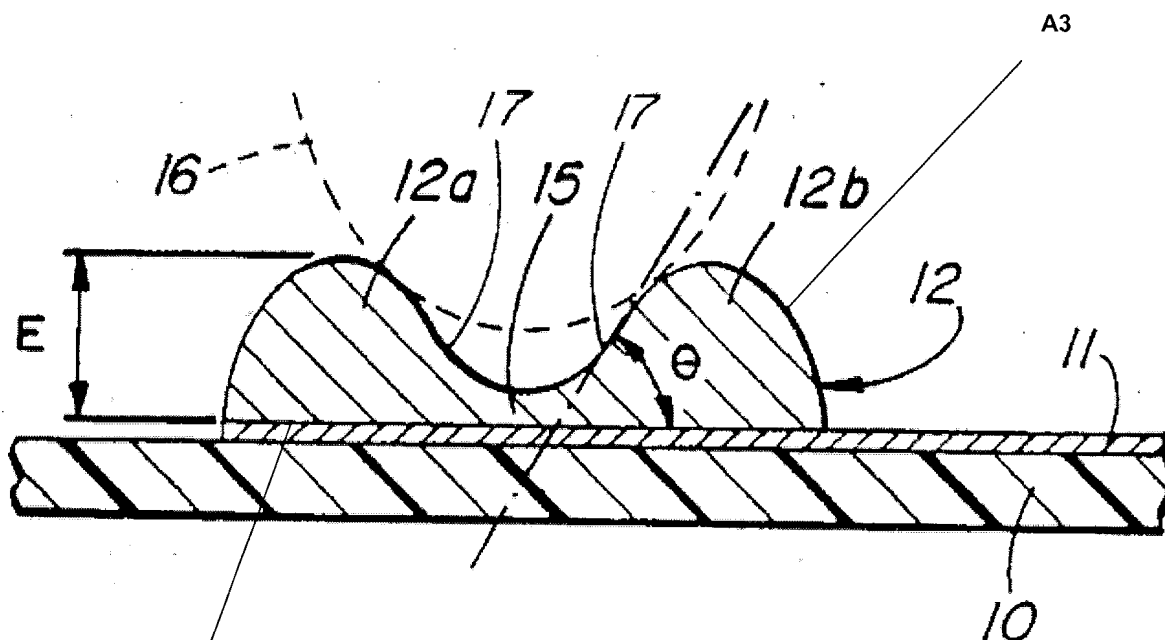


FIG. 2

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4,532,681 (Baker et al.)

FIG. 5.

